3 SYSTEM DEMANDS

3.1 WATER CONSERVATION BILL OF 2009 - BASELINES AND TARGETS

Urban Water Management Planning Act Requirement:

10608.20(e) An urban retail water supplier shall include in its urban water management plan … due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

In order to improve the Sacramento-San Joaquin Delta, in 2008 Governor Schwarzenegger directed State water agencies to develop a plan to achieve a twenty percent per capita water use reduction by the year 2020. The Water Conservation Act of 2009 (Senate Bill x7-7), passed in November 2009, provides the legislative framework to implement the conservation goals, and requires retail water suppliers to detail their strategy for achieving the reduction requirement in their 2010 Urban Water Management Plan Updates. The Urban Water Management Planning Act and SBx7-7 can be found in Appendices C and D of this document, respectively.

Explicit methodologies were developed by the California Department of Water Resources (DWR) to assist retail water suppliers in complying with the Water Conservation Act of 2009, and they are detailed in the technical document, "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use." The City of Morgan Hill utilized the DWR methods when determining its baseline, interim, and water use target values, the steps of which are described in detail in the following sections.

The methodologies laid out by DWR instruct urban water suppliers to determine their baseline and target water use values through performing four main steps, which are as follows:

- Step 1: Determine Base Daily Per Capita Water Use
- Step 2: Determine Urban Water Use Target
- Step 3: Compare Urban Water Use Target to the 5-year Baseline (verification of 95% minimum reduction requirement)

- Step 4: Determine Interim Urban Water Use Target

Water suppliers are given the option of determining their 20x2020 target values either individually, or through a regional alliance. The City of Morgan Hill has initiated discussions with other jurisdictions regarding the establishment of a regional reporting alliance. The City intends to finalize these discussions during the next two years and incorporate any potential regional alliance in the City's 2015 Urban Water Management Plan. For the 2010 Plan, the City has determined its baseline and target values individually.

3.1.1 Step 1: Determine Base Daily Per Capita Water Use

Baseline daily per capita water use is defined as an urban water supplier's estimate of its average gross water use, reported in gallons per capita per day (GPCD) and calculated over a continuous base period.

Steps 1A – 1C: Determine Supplier 10- to 15-year, and 5-year Base Periods

Urban retail water suppliers are required to choose a continuous, 10-year baseline period ending no earlier than December 31, 2004 and no later than December 31, 2010 when determining Base Daily Per Capita Water Use. The option to extend the baseline to a 15-year period is given to water suppliers if recycled water accounts for at least 10 percent of their 2008 retail water deliveries. The City of Morgan Hill does not utilize recycled water as a source of water, and therefore the 10-year baseline period beginning January 1st, 1999 and ending December 31st, 2008 was chosen.

The 5-year baseline period is used to determine the retail water supplier's minimum water use reduction, and the period must end no earlier than December 31st, 2007 and no later than December 31st, 2010. January 1st, 2003 through December 31st, 2007 was chosen as the 5-year baseline period for City of Morgan Hill. Table 3.1.1 summarizes the City of Morgan Hill's baseline period selections.

Table 3.1.1
Base Period Ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	8,570	*acre-ft*
	2008 total volume of delivered recycled water	0	*acre-ft*
	2008 recycled water as a percent of total deliveries	0.00%	percent
	Number of years in base period	10	years
	Year beginning base period range	1999	
	Year ending base period range	2008	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Units: acre-feet per year

Steps 1D – 1E: Estimate Service Area Population

The City of Morgan Hill Water Department's service area encompasses more than 95% of the City's limits. Therefore, the California Department of Finance (DOF) E-4 Population Estimates for the City of Morgan Hill were used to estimate the service area's total population for the baseline years.

Step 1F: Calculate Gross Water Use

Groundwater is the sole source of water supply for the City of Morgan Hill's service area, and it is extracted via a series of wells. Gross water use was estimated as the total volume pumped from the network of wells for each calendar year in the baseline period, and well production data were obtained through the City of Morgan Hill Public Works Department.

Steps 1G – 1I: Determine Annual and Base Daily Per Capita Water Use

Annual daily per capita water use for the City of Morgan Hill was estimated by dividing the gross water use by the service area's total population for each calendar year of the baseline period. The average of these values over the 10-year baseline was then determined, giving the Base Daily Per Capita Water use value for the City of Morgan Hill, **199 GPCD**.

Table 3.1.2 summarizes the data used to determine the Base Daily Per Capita Water Use value.

Table 3.1.2 Base Daily Per Capita Water Use — 10-Year Range				
Base period year		Distribution System Population	Daily System Gross Water se (MGD)	Annual Daily Per Capita Water Use (GPCD)
Sequence Year	Year			
Year 1	1999	31,900	6.20	194
Year 2	2000	33,586	6.71	200
Year 3	2001	34,164	6.96	204
Year 4	2002	34,721	7.09	204
Year 5	2003	34,864	6.90	198
Year 6	2004	35,625	7.24	203
Year 7	2005	36,292	7.05	194
Year 8	2006	37,061	7.14	193
Year 9	2007	38,193	7.67	201
Year 10	2008	39,042	7.65	196
			Base Daily Per Capita Water Use	199

3.1.2 Determine Urban Water Use Target

The Water Conservation Act of 2009 provides the retail water supplier the choice of four methods for determining the urban water use target value. The four methods are:

- Method 1: 80% of Base Daily Per Capita Water Use Value
- Method 2: Performance Standards
- Method 3: 95% of the Hydrologic Region 2020 Target Value
- Method 4: Water Savings (developed by DWR)

Method 1 was chosen by the City of Morgan Hill, as it effectively limits the maximum reduction an individual water supplier is required to achieve to 20 percent. The other three methods imposed reduction targets greater than the 20 percent required by Method 1 and were therefore dismissed, in order to prevent placing undue burden on the City. Thus, the City of Morgan Hill's 2020 Urban Water Use Target is **159 GPCD**.

3.1.3 Confirm Urban Water Use Target

The Water Conservation Act of 2009 sets a minimum reduction requirement the water supplier's urban water use target must meet or exceed. The minimum reduction is defined as 95 percent

of the 5-year baseline period's Base Daily Per Capita Water Use Value. Table 3.1.3 provides a summary of the 5-year baseline calculations.

Table 3.1.3
Base Daily Per Capita Water Use — 5-Year Range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Year			
Year 1	2003	34,864	6.90	198
Year 2	2004	35,625	7.24	203
Year 3	2005	36,292	7.05	194
Year 4	2006	37,061	7.14	193
Year 5	2007	38,193	7.67	201
			Base Daily Per Capita Water Use	198

The urban water use target value of 159 GPCD exceeds the minimum reduction requirement of **188 GPCD** (95% of 198 GPCD), and it is therefore confirmed as the City's Urban Water Use Target.

3.1.4 Determine Interim Urban Water Use Target

The interim urban water use target is defined as the water use goal the water supplier is to achieve and report in the 2015 UWMP Update, and equals half of the target 2020 reduction. The interim urban water use target for the City of Morgan Hill is **179 GPCD** (90% of 199 GPCD).

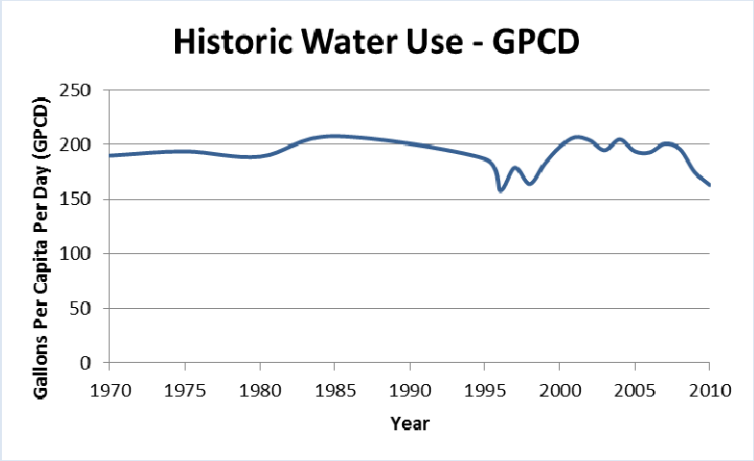
3.2 WATER DEMANDS

Urban Water Management Planning Act Requirement:

10608.20(e)(1)&(2) Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) Agricultural.

3.2.1 Historic Water Use

Figure 3.2.1 – Historic Water Use



The City of Morgan Hill Water System currently serves approximately 40,200 people within its service area. The Historic Water use is shown in Figure 3.2.1. In the recent past, the population of Morgan Hill increased dramatically, with growth rates between 1975 and 1980 approaching 15% per year. However, population growth in Morgan Hill has since been controlled by the "Residential Development Control System (RDCS)," enacted by the community. The RDCS limits the number of residential building allotments in any given year, based in part on current and projected populations. Due to the RDCS, the City's population is expected to grow at a more modest rate through the UWMP's planning horizon.

Usage of water per capita per day has shown significant fluctuation during the last fifteen years, as shown in Table 3.2.1. Consumption has ranged from a low 155 GPCD in 1991 at the height of a drought to a maximum of 265 GPCD in 1987 (not shown in the table). The average use per day during the period from 2000 through 2010 was 194 gallons per person.

Table 3.2.1
Historic Water Use

Year	Annual Production (Acre-Feet)	Population	Usage Per Capita Day (GPCD)
1970	1,190	5,579	190
1975	1,927	8,882	194
1980	3,587	16,924	189
1985	4,642	19,918	208
1995	5,690	27,138	187
1996	6,013	27,933	158
1997	6,808	29,246	179
1998	6,216	30,786	164
1999	6,945	31,900	194
2000	7,513	33,586	200
2001	7,802	34,164	204
2002	7,938	34,721	204
2003	7,730	34,864	198
2004	8,105	35,625	203
2005	7,896	36,292	194
2006	7,998	37,061	193
2007	8,591	38,193	201
2008	8,570	39,042	196
2009	7,803	39,813	175
2010	7,333	40,246	163

The City of Morgan Hill's past water use and number of customer connections for the 2005 calendar year are shown in Table 3.2.2, separated by water use sector.

Table 3.2.2
Water Deliveries — Actual, 2005

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	6,900	4,606	0	0	4,606
Multi-family	1,695	1,132	0	0	1,132
Commercial	714	768	0	0	768
Industrial	12	13	0	0	13
Institutional/governmental	53	68	0	0	68
Landscape	502	1,592	0	0	1,592
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	9,876	8,179	0	0	8,179

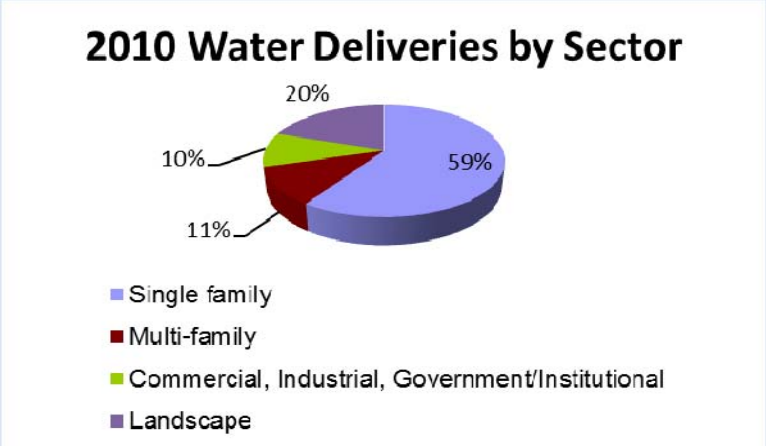
Units: acre-feet per year

3.2.2 Current and Projected Water Use by Sector

In 2010, the City used 6,778 acre-feet of water from the Llagas and Coyote Valley Subbasins as measured at metered locations throughout the City. Average water deliveries, shown in Figure 3.2.2, are broken down into the following sectors:

- Single Family Residential
- Multi-Family Residential
- Commercial & Industrial
- Government / Institutional
- Landscape

Figure 3.2.2 –Water Deliveries



Number of connections and water use are projected for the next 20 years, in five year increments, and are broken down by sector. The future estimations of water use and connections (by sector) are extrapolated based on the current (2010) values, anticipated population growth, and the Interim (2015) and Final (2020)

Target Water Use Reduction Goals.

Residential Sector

The City of Morgan Hill began separating single- and multi-family connections and water usage statistics in 2005. Current and future water demand projections for single- and multi-family residential customers are shown in Tables 3.2.3 – 3.2.6.

Commercial and Industrial Sectors

The City of Morgan Hill combines its commercial and industrial customers into a single sector when tracking water usage statistics, and adequate records to distinguish the two categories are not available for the 2010 calendar year. Therefore, current water uses of the commercial and industrial sectors are represented as a single category, shown in Table 3.2.3. Future water demand predictions, shown in Tables 3.2.4 – 3.2.6, also project commercial and industrial water uses as a single sector, as they are developed based on the current year's information.

Institutional / Governmental Sector

Historically, the City of Morgan Hill has combined its government and institutional customers into the same category with its commercial and industrial users. In 2005, the City began tracking these sectors separately. However, the City does not separate its institutional and government customers, and therefore the current and projected water demands are estimated as a single sector in the following tables.

Landscape Sector

Beginning in 2004, the City of Morgan Hill began tracking landscape and city landscape connections separately. The current and projected water demands for both sectors are shown in Tables 3.2.3 – 3.2.6.

Agricultural Sector

The City of Morgan Hill does not provide water for agricultural uses.

Table 3.2.3
Water Deliveries — Actual, 2010

	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	8,984	4,025	0	0	4,025
Multi-family	1,736	740	0	0	740
Commercial, Industrial, Government/Institutional	784	674	0	0	674
Landscape	628	1,339	0	0	1,339
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	12,132	6,778	0	0	6,778

Units: acre-feet per year

Table 3.2.4
Water Deliveries — Projected, 2015

	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	9,907	5,358	0	0	5,358
Multi-family	1,914	985	0	0	985
Commercial, Industrial, Government/Institutional	865	897	0	0	897
Landscape	693	1,782	0	0	1,782
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	13,379	9,023	0	0	9,023

Units: acre-feet per year

Table 3.2.5
Water Deliveries — Projected, 2020

	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	10,595	5,090	0	0	5,090
Multi-family	2,047	936	0	0	936
Commercial, Industrial, Government/Institutional	925	852	0	0	852
Landscape	741	1,693	0	0	1,693
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	14,307	8,571	0	0	8,571

Units: acre-feet per year

Table 3.2.6
Water Deliveries — Projected 2025 and 2030

	2025		2030	
	metered		metered	
Water use sectors	# of accounts	Volume	# of accounts	Volume
Single family	11,186	5,374	11,913	5,723
Multi-family	2,162	988	2,302	1,053
Commercial	976	899	1,040	958
Landscape	782	1,788	833	1,904
Agriculture	0	0	0	0
Other	0	0	0	0
Total	15,106	9,049	16,087	9,637

Units: acre-feet per year

3.2.3. Sales to Outside Agencies

The City of Morgan Hill does not sell wholesale water to other agencies. Table 3.2.7 is provided to quantify that Morgan Hill does not intend to sell water to other water agencies within the planning period.

Table 3.2.7
Sales to Other Water Agencies

Water Distributed	2005	2010	2015	2020	2025	2030
Not Applicable	0	0	0	0	0	0
Total	0	0	0	0	0	0

Units: acre-feet per year

3.2.4. Other Water Uses and Losses

Systems losses are tracked by the City's water billing division to ensure losses do not exceed 7% annually. Projected system losses are estimated on the City maintaining this value throughout the planning period. The system losses are summarized in Table 3.2.8.

Table 3.2.8
Additional Water Uses and Losses

Water Use	2005	2010	2015	2020	2025	2030
Saline barriers	N/A					
Groundwater recharge	N/A					
Conjunctive use	N/A					
Raw water	N/A					
Recycled water	N/A					
System losses	656	555	683	648	685	729
Other (define)	N/A					
Total	656	555	683	648	685	729

Units: acre-feet per year

3.2.5 Total Water Demands

The total past, current, and future water demands for the City of Morgan Hill are summarized in Table 3.2.9.

Table 3.2.9
Total Water Use

Water Use	2005	2010	2015	2020	2025	2030
Total water deliveries (Tables 3.2.2 to 3.2.6)	7,240	6,778	8,340	7,922	8,365	8,908
Sales to other water agencies (Table 3.2.7)	N/A	N/A	N/A	N/A	N/A	N/A
Additional water uses and losses (Table 3.2.8)	656	555	683	648	685	729
Total	7,896	7,333	9,023	8,571	9,049	9,637

Units: acre-feet per year

3.2.6 Lower Income Housing Projections

Urban Water Management Planning Act Requirement:

10631.1(a) The water use projections required by Section 10631 shall include projected water use for single-family and multi-family residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

Table 3.2.10 summarizes the lower income water use projections for the City of Morgan Hill, and the lower income water demands are also included as part of the total residential water demand estimates and projections in Tables 3.2.3 – 3.2.6. The Housing Element of the City of Morgan Hill's General Plan was used to obtain the lower income housing data, and estimates through 2014 were provided. Demand projections beyond 2014 were estimated based on 2014 values and overall population growth to determine lower income housing needs throughout the entire UWMP planning horizon.

Table 3.2.10
Low-Income Projected Water Demands

Low Income Water Demands	2014	2015	2020	2025	2030
Single-family residential	26	27	42	57	76
Multi-family residential	11	12	18	24	33
Total	37	39	60	82	109

Units: acre-feet per year

3.3 WATER DEMAND PROJECTIONS

Urban Water Management Planning Act Requirement:

10631(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for the inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

The City of Morgan Hill does not rely on a wholesale agency for a source of water, and the City does not expect to rely on a wholesale agency in the future. Table 3.3.1 is provided to quantify that Morgan Hill does not intend to purchase wholesale water within the planning period.

Table 3.3.1
Retail Agency Demand Projections Provided to Wholesale Suppliers

Wholesaler	2010	2015	2020	2025	2030
Not Applicable	0	0	0	0	0
Total	0	0	0	0	0

Units: acre-feet per year

3.4 WATER USE REDUCTION PLAN

Urban Water Management Planning Act Requirement:

CWC §10608.29 Urban wholesale water suppliers shall include in the urban water management plans … an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part (10608.36). Urban retail water suppliers are to prepare a plan for implementing the Water Conservation bill of 2009 requirements and conduct a public meeting which includes consideration of economic impacts.

The City of Morgan Hill has implemented an economical, yet sound, water use reduction plan in order to meet the 20x2020 water use reduction requirements. Options to reduce water demand in the City include:

- Increasing public awareness regarding the 20x2020 water conservation requirements and encouraging the public to adopt efforts that can be easily implemented to conserve water.
- Potentially imposing higher water rates for residential customers in the upper tiers of household consumption.
- Implementing landscape water rates based on the Model Water Efficient Landscape Ordinance (AB 325).
- Developing a multi-phase contingency strategy for achieving compliance daily per capita water use in 2015, including additional steps to reduce the use of landscape water in the event 2015 per capita water use is not anticipated to meet the interim reduction requirements.
- Continuing to promote and expand the water conservation programs currently in place, including the fourteen Demand Management Measures outlined in Section 6.0 of this Plan.
- Implementing strict landscape restrictions on new residential and commercial developments, and approving the construction of new residential developments that contain small, efficient lot sizes to reduce landscape water use.